

Include as many feeder roots with the soil as possible.

### Submitting the sample

Complete the *Nematode Assay Information* sheet (form AD3) for preseason samples taken to predict potentially harmful plant nematode populations. Complete the *Nematode Problem-Diagnosis Information* sheet (form AD5) for samples taken during the growing season to diagnose suspected nematode problems. To get accurate assay results and recommendations, you must provide details of crop history.

Information sheets are available online [select **Information Sheets** from the Agronomic Division home page]. You can also pick them up at any Cooperative Extension office or from the Agronomic Division office.

Use permanent ink to fill out forms and label boxes. Give each sample a unique identifier made up of five letters and/or numbers, and write it in the designated spaces on the sample box and in the SAMPLE ID space on the information sheet. Choose an identifier that will help you remember which area it corresponds to, such as GOOD, BAD, COT1, COT2, BEANS or LAWN.

Plan to ship samples, along with information sheet(s) and the appropriate processing fee, so they will arrive as soon as possible.

### Obtaining the report

Nematode assay and report generation require one to three weeks. Delays are most likely to occur from January through March when sample load is the heaviest. Sample results will be released only if the fee has been paid.

N.C. residents can access their reports online [select **Find Your Report** from the home page] and/or wait to receive reports

through the mail. Reports for out-of-state samples are not currently available online but can be e-mailed by request.

The report is mailed along with NemaNotes and a cover sheet that explain technical terms, hazard indexes and nematode management options. This material is also available online [select **Publications** from the home page].

NCDA&CS regional agronomists are available throughout the state to provide advice on sampling, interpreting report results and implementing recommendations. Names, county assignments and contact information are available online at [www.ncagr.com/agronomi/rahome.htm](http://www.ncagr.com/agronomi/rahome.htm).

## North Carolina Department of Agriculture and Consumer Services

Steve Troxler, Commissioner of Agriculture

### Agronomic Division Nematode Assay Section

Physical Address: 4300 Reedy Creek Road  
(DHL, FedEx, UPS) Raleigh, NC 27607-6465

Mailing Address: 1040 Mail Service Center  
(U.S. Postal Service) Raleigh, NC 27699-1040

Phone: (919) 733-2655

Web site: [www.ncagr.com/agronomi/](http://www.ncagr.com/agronomi/)

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## Sampling for Plant-Parasitic Nematodes

Plant-parasitic nematodes are microscopic threadworms, most of which live in the soil and feed on plant roots. The Agronomic Division can assay soil samples for the presence of at least 46 different plant-parasitic nematodes. Nematode assay results can

- predict a nematode problem on a specific crop for the upcoming season,
- diagnose an existing nematode problem and/or
- suggest appropriate management strategies.

These strategies can increase crop yields, save on pesticide costs and minimize runoff of harmful chemicals into surface or ground waters.

### Taking a nematode soil sample

Follow the procedures below carefully. *The assay is only as good as your sample.*

- Use boxes, bags and information sheets designed specifically for nematode assays. They are available from the NCDA&CS Agronomic Division, Cooperative Extension offices and many ag-chemical dealers.
- Take samples only when the soil is in good working condition. Soil should not be frozen, nor should it be excessively wet or dry.
- Collect at least 20 soil cores to a depth of 4 to 8 inches. Thoroughly mix the cores together in a plastic bucket.
- Use this mixture to fill the plastic bag that comes with the nematode assay sample box. Seal the bag tightly, and place it inside the sample box. Print your name, address

and field number in the spaces provided on the box.

- If soils vary in the sampled area, take a separate sample for each soil type.
- Boxed samples must be protected from overheating and freezing. Do not place samples in direct sunlight, the trunk of a car or a freezer.

**Note:** Samples submitted for nematode assay cannot be tested for lime requirements or plant nutrients. For this information, you must submit a separate soil sample in a soil sample box with a *Soil Sample Information* sheet (form AD1).

### Sampling to predict a problem (Fig. 1)

Sampling for predictive nematode assays takes place before the desired crop is in the ground. For annual crops, this is usually in late summer or early fall, soon after (or just before) harvest of the existing crop and several months before planting the next crop. Sampling close to harvest ensures that nematode populations are at their peak and that the assay will be a good indicator of any potential problems.

For perennial crops, plan to collect samples well before planting so there will be time to treat, if necessary. It is very difficult to manage nematodes on an established crop. In high-value established landscapes like golf courses, however, it can be prudent to sample for nematodes on a regular basis so management can be scheduled for off-peak seasons.

■ **Field crops.** Take a sample from each section of a field with a distinct crop history. For example, if a 4-acre field will be planted in tobacco next year and if half of it is currently planted with corn and half with soybeans, then you need to take two separate samples: one from the corn field and one from the soybean field.

To obtain representative samples from larger fields with uniform crop histories, divide fields into 4- to 5-acre units and then select samples from at least half of these units. Label samples carefully for your records.

■ **Home gardens.** One sample is sufficient, except for areas larger than one-half acre or where soil type differs greatly from one end of the garden to the other.

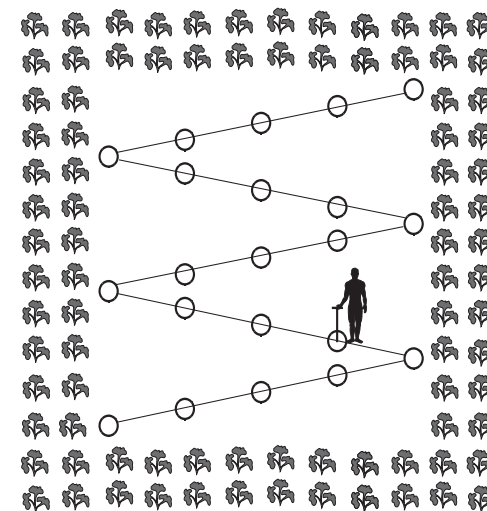
■ **Ornamentals, shrubs, trees and turfgrass.** Send a separate sample for each plant species and specify the plant name. For example, *American boxwood* is a good description; *Shrubs* is not.

### Sampling to diagnose a problem (Fig. 2)

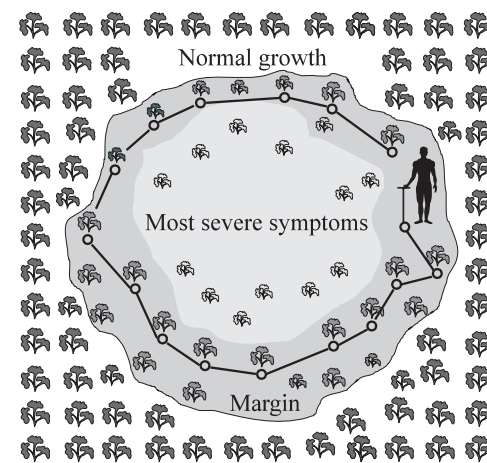
Use a combination of agronomic tests when trying to diagnose whether an existing plant growth problem might be due to nematodes. Collect a soil sample with roots for nematode problem diagnosis as well as a comparison sample from a nearby area where growth is more nearly normal. Because most problems have more than one cause, submit samples for soil nutrient and plant tissue analyses as well.

Package each different kind of sample separately. Submit diseased plant specimens to the NCSU Plant Disease and Insect Clinic (PDIC) through your NCDA&CS regional agronomist or county Cooperative Extension agent. As you fill out the *Nematode Problem-Diagnosis Information* sheet, indicate whether you have sent matching samples from the same area to the Agronomic Division's soil testing or plant analysis labs or to the PDIC.

You can collect samples for nematode assay any time plants are actively growing and the soil is in good working condition. Take soil from the root zone of plants that are affected but still alive. Never sample beneath dead plants.



**Figure 1.** Sampling pattern for a 5-acre field with a distinct crop history. Collect at least 20 cores.



**Figure 2.** Sampling pattern for diagnosing nematode problems. Take soil cores from the margin of affected areas and only from the roots of affected plants that are still alive.